

ACID RAIN DIVISION  
Office Number 233-9150  
FAX Number - 233-9585  
Mail Code - 62047

## FAX COVER SHEET

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**GOVERNMENT BY EXAMPLE:  
FEDERAL GREENHOUSE GAS REDUCTION INITIATIVE**

	<u>Low Case</u>	<u>High Case</u>
1) <i>Measure Description</i>	Federal government commits to reduce or offset 100% of greenhouse gas emissions from electricity use at federal buildings. Government green pricing programs lead to a 5% participation rate in the residential sector and a 2% participation rate in the commercial sector.	Federal government commits to reduce or offset 100% of greenhouse gas emissions from all federal electricity use. Government green pricing programs lead to a 10% participation rate in the residential sector and a 5% participation rate in the commercial sector.
2) <i>Emission Reduction from base (MMTC-a)</i>		
Cumulative to 2030	646.3	1174.1
Highest year	25.3	47.5
2010	22.7	41.7
2030	25.3	47.5
2000	0.5	1.0
3) <i>Annualized Compliance Costs</i>		
3% discount rate	\$313.3 mill.	\$651.4 mill.
7% discount rate	\$173.5 mill.	\$355.1 mill.
All social costs are voluntary		
4) <i>Federal Budget Costs<sup>1</sup></i>		
-in 1896	0	0
-in 2000	\$0.5-\$14.2 mill.	\$2.0-\$29.3 mill.
-in 2005	\$2.0-\$195.4 mill.	\$4.0-\$227.9 mill.
5) NA, proposal is already below the \$50/ton level.		
5) NA, proposal calls for the offsetting of fossil fuel generation with renewable energy generation; there are no demand-side reductions included in this proposal.		
7) <i>Cumulative Investments</i>		
-by 2010	\$5.5 bill.	\$9.6 bill.
-by 2030	\$21.8 bill.	\$40.8 bill.
8) <i>Interaction with other measures</i>		
Other efforts to reduce federal electricity use such as federal DSM programs will help reduce the net billing impacts from a green price premium. Some coordination with other programs will be needed to ensure double counting does not occur in meeting the Federal government pledge of no net greenhouse gas emissions.		

<sup>1</sup> A lower end upper range is given for both cases. The lower range value includes cost savings from federal DSM programs; the upper range value does not include cost savings from federal DSM programs.



## GOVERNMENT BY EXAMPLE: FEDERAL GREENHOUSE GAS REDUCTION INITIATIVE

### Description

As a major end-use consumer of energy, the federal government contributes significantly to greenhouse gas emissions. This option requires that beginning in the year 2000, the federal government will fulfill its facility electricity needs with no net greenhouse emissions or with a significant reduction in emissions.

This option allows complete flexibility on how the reductions are achieved. The primary mechanism presented in this proposal is a federal green pricing program. Green pricing is an optional electric utility service that allows customers to choose to have their energy needs met with renewable resources.<sup>2</sup> In this case, federal electricity purchases are made at a cost premium of 10% to obtain electricity from non-greenhouse gas generating resources. Government leadership in green pricing structures will most likely lead to green pricing options to residential and commercial customers.

### Policy Implications

#### Government Leadership

This option would complement other efforts to achieve policy goals through government leadership. Government procurement has played a leading role in recent environmental policy efforts. Products currently purchased with environmental specifications include recycled paper and Energy Star computers.

On Earth Day 1993 President Clinton challenged the federal government to, "lead by example - - not by bureaucratic fiat." The series of executive orders issued on Earth Day included the government procurement of Energy Star computers and an expansion of government efforts to purchase alternative fuel vehicles for federal fleets. This option could tie together greenhouse gas reduction programs throughout the federal system.

The Office of Technology Assessment has noted several advantages to federal leadership in energy issues,<sup>3</sup> including the following:

<sup>2</sup> Moskovitz, David, Green Pricing: Experience and Lessons Learned, Regulatory Assistance Project.

<sup>3</sup> Office of Technology Assessment, Energy Efficiency in the Federal Government: Government by Good Example, May 1991, Washington, DC, p. 13.

- promotes the use of these measures throughout the economy by demonstrating their cost and performance;
- accelerates manufacturers' development of technologies, again for use throughout the economy not just in the Federal Government;
- learn first-hand which approaches work as a basis for national policy; and
- reduces energy-related environmental and security problems.

#### *Creating a "Green Power" Market*

A federal "no net greenhouse gas" pledge could be a springboard for similar green pricing services in the residential and commercial sectors. The federal government as a major end-use consumer of electricity could be instrumental in creating a market for green pricing services from utilities. End-user demand for this product from a large and stable customer could help the adoption of this product with many other utility customers.

Renewable energy technologies such as biomass, geothermal, solar, and wind energy possess significant technical capabilities, but have lacked markets to gain sufficient economies of scale. Despite this lack of scale economies, technologies such as wind energy have reduced costs below the \$.05/KWh level. Green pricing could be the best near term opportunity for these technologies to reduce costs further as well as help diversify the US energy mix.

A survey conducted by the Wall Street Journal<sup>4</sup> estimates 28% of consumers are committed to purchasing environmentally sustainable products and would pay a price premium for such products. Even at only a 10% participation rate, residential green pricing would translate into a reduction of 19.4<sup>5</sup> additional MMTC per year based upon 1990 electricity use. Likewise, commercial sector participation in programs such as Green Lights indicates the potential for a green power market in this sector as well. A conservative 5% participation rate from the commercial sector translates into a reduction of another 9.9 MMTC<sup>6</sup> per year.

This option will complement federal efforts to foster green pricing acceptance at the utility commission level. This dual approach of a large customer requesting the service and technical support to utility commissions may help make green pricing a viable utility product.

<sup>4</sup> Wall Street Journal, March 23, 1991.

<sup>5</sup> Energy Information Agency, Annual Energy Outlook 1994, p. 98.

<sup>6</sup> Ibid.



### Green Pricing in a Competitive Electricity Market

Green pricing has been cited by proponents of a competitive electricity market as a mechanism to combine environmental concerns with competition. Green pricing is about customer choice. As customer choice becomes a greater issue within direct access and retail wheeling proposals, green pricing remains a viable and likely private sector outcome to segmenting customer preferences.

#### The Green Pricing Concept

In green pricing programs, a price premium is paid by customers who choose to have their energy needs met by renewable resources. A price premium of 10%<sup>7</sup> is typically adequate to pay for a portfolio of renewable energy resources such as biomass, geothermal, solar, and wind resources. The electric utility then commits to purchase energy from renewable energy resources in an amount equal to the customer's electricity use. Thus, through this mechanism, renewable energy resources are purchased only at the marginal cost difference between these resources and fossil fuel resources.

Green pricing mechanisms are beginning to appear in electric utilities across the nation. The *Sacramento Municipal Utility District (SMUD)* has implemented its "PV Pioneers" program in which customers pay a price premium to have a 4 kW solar photovoltaic system installed on their roof-tops. In the first year (1993), these systems were installed for 108 customers. SMUD plans to continue adding 100 homes to the program over the next few years.

In November of 1993, *Traverse City Light and Power* of Michigan initiated a program in which subscribers pay a premium for the utility to install a 500 kW wind turbine. The necessary support level of 200 subscribers was reached in June 1994. The wind machine will be installed in spring 1995. Programs are also being developed and/or implemented at *New England Electric System*, *Niagara Mohawk Power Corporation*, and *Public Service Company of Colorado*.

One possible concern of a green pricing program is the introduction of intermittent resources that may not match utility dispatch needs. Based upon the conservative participation levels projected in this proposal (5-10% in the residential sector and 2-5% in the commercial sector), the amount of possibly intermittent resources should not cause difficulties with utility dispatch. Existing use of renewable resources is sufficiently low that extremely high participation rates would have to occur to affect utility dispatch. Also, several forms of renewable energy such as

<sup>7</sup> Hamrin, Jan. *Affected with the Public Interest: Electric Utility Restructuring in an Era of Competition*. National Association of Regulated Utility Commissioners, 1994, p. 141.

biomass energy are dispatchable and can be introduced to utility systems without disrupting utility dispatchability.

#### Greenhouse Gas Reduction Potential

In 1990, the federal government's energy consumption resulted in the emission of approximately 35.6 MMTC. Of this total, 8.9 MMTC was due to electricity use at federal buildings. An additional 1.9 MMTC was due to electricity use from federal process operations. (See Supplement A for a complete breakdown of federal emission sources). The proposal's "low case" seeks to offset emissions from electricity use at federal buildings. The "high case" seeks to offset emissions from all federal electricity use.

Future federal energy use may be lower due to a number of executive orders seeking greater use of demand-side measures in federal buildings.<sup>4</sup> The 1992 Energy Policy Act sets a goal of a 20% reduction in federal energy use from 1985 levels. This proposal assumes the Energy Policy Act goals are met.

Since a federal green pricing program is expected to lead to similar programs in the residential and commercial sectors, additional emissions are projected for these sectors. The Energy Information Agency's "Annual Energy Outlook" provides energy use data as well as projections for future years. In 1990, greenhouse gas emissions from residential electricity use was 193.9 MMTC. Greenhouse gas emissions from commercial electricity use was 176.0 MMTC. (See Supplement A for electricity usage in the residential and commercial sectors).

The proposal's low case projects a green pricing participation rate of 5% in the residential sector and 2% in the commercial sector. The proposal's high case projects a green pricing participation rate of 10% in the residential sector and 5% in the commercial sector.

<sup>4</sup> Federal DSM programs include:

- Federal Energy Management Improvement Act of 1986 (FEMIA) - 10% reduction in federal building energy use by 1995 from 1985 levels.
- Executive Order 12759 (April 17, 1991) - 20% reduction in federal building energy use by 2000 from 1985 levels.
- Energy Policy Act of 1991 (EPA) - 20% reduction in federal building energy use by 2000 from 1985 levels; by 2005 install all measures with a payback of 10 years or less. (Subtitle F, Federal Agency Energy Management)



### Costs

Green pricing is a relatively low cost option for greenhouse gas reduction. These costs are paid on an entirely voluntary basis by the participants. There are no costs to non-participants. (See Supplement B for a detailed explanation of cost calculations for the federal, residential, and commercial sectors).

In addition to the price premium paid by participating customers including the federal government, federal administrative costs are included in the proposal's cost figures. These administrative costs are to cover the monitoring of federal emissions as well technical assistance to utility commissions on green pricing mechanisms.

The marginal cost difference between renewable energy technologies and conventional technologies should decrease as the renewable energy industry matures. Some renewable technologies are already competitive with conventional technologies. The price premium paid in a green pricing program will most likely decrease over time. However, for purposes of this proposal, no further cost reductions are assumed. (See Supplement C for a detailed explanation of investment calculations for renewable energy technologies).

### Compatibility with Federal Demand-Side Management Programs

This proposal is designed to be consistent with existing demand-side management programs to reduce federal energy use. The reduction of federal energy use by 20% from 1985 levels, as suggested in the Energy Policy Act, is assumed for this proposal.

While such programs reduce the government's consumption of electricity and thus the greenhouse reduction potential of a federal green pricing program, these programs can have a positive effect on costs. The savings from these demand-side management programs will most likely mean that the net federal electricity bill will remain the same or possibly be less after the 10% price premium.

The expansion of existing federal demand-side management programs or renewable energy purchase programs could qualify for meeting the proposed requirements of no net greenhouse emissions from federal electricity use. The key factor will be to ensure existing programs are not double counted for credit.

### Implementation

Federal procurement policy can be implemented through executive order. Analogous executive orders have been issued concerning federal energy procurement. Government agencies are currently required to document energy use and

progress in energy efficiency through FEMP reporting. Federal carbon impacts could also be recorded in this format.

#### Reduction and Offset Options

The "Government by Example" option allows for complete flexibility on how the reductions or offsets are achieved. Government decisions could be made based upon the most cost-effective choices in offsetting the carbon emissions. Green pricing was selected for the purposes of this proposal based upon its cost effectiveness. (See Supplement C for a list of federal greenhouse reduction options).



### Supplement A Electricity Use and Greenhouse Gas Emissions by Sector

#### Federal Sector

The amount of federal electricity use is documented each year in the Department of Energy's "Annual Report to Congress on Federal Energy Management and Conservation Programs." This report classifies federal energy usage by three different groupings, federal buildings, processes, and vehicles. Fiscal year 1985 was selected as the baseline since EPA's federal DSM goals are based upon a 20% reduction from 1985 levels.

The following is a summary of 1985 federal energy use in *buildings*:

<u>Energy Type</u>	<u>Energy Use (Billions of BTU)</u>	<u>Emissions (MMTC)</u>
Electricity	143,908.7	8.9
Natural Gas	143,322.5	2.0
Fuel Oil	107,601.7	2.1
Coal	58,068.7	1.5
Purchased Steam	7,987.5	0.6
LPG/Propane	3,648.0	0.05
Other	4,675.4	0.3
<b>Total</b>	<b>409,192.5</b>	<b>15.4</b>

The following is a summary of 1985 federal energy use from *process operations*:

<u>Energy Type</u>	<u>Energy Use (Billions of BTU)</u>	<u>Emissions (MMTC)</u>
Electricity	21,533.8	1.3
Natural Gas	4,645.3	0.06
Fuel Oil	7,032.5	0.1
Coal	5,974.6	0.2
Purchased Steam	987.6	0.08
LPG/Propane	72.2	0.001
Other	0.0	0.0
<b>Total</b>	<b>40,245.8</b>	<b>1.7</b>

The following is a summary of 1985 federal energy use from vehicles and equipment:

<u>Energy Type</u>	<u>Energy Use (Billions of BTU)</u>	<u>Emissions (MMTC)</u>
Jet Fuel	705,675.5	14.0
Dist./Diesel	169,412.1	3.4
Auto Gasoline	50,484.7	1.0
Aviation Gas	1,882.3	0.04
LPG/Propane	149.4	0.002
Navy Special	6,695.9	0.1
Other	236.6	0.005
Total	934,536.5	18.5

If the "Government by Example" program was expanded to all federal activities, then the sum of federal facility, process, and vehicle energy use must be reduced or offset. The sum of all government greenhouse emissions is 35.6 MMT (16.4 + 1.7 + 18.5).

#### Residential Sector

The values from the "Annual Energy Outlook 1994" for the residential sector are as follows:

<u>Year</u>	<u>Electricity Use (Billions of BTUs)</u>	<u>Emissions (MMTC)</u>
1990	3,150,000	193.9
2000	3,390,000	208.6
2005	3,480,000	214.2
2010	3,630,000	223.4

EIA projects an annual growth rate of 0.7% for electricity use in the residential sector for the years 1990-2010. For purposes of this proposal, the 0.7% growth rate is assumed to hold through the year 2030.



Commercial Sector

The values from the "Annual Energy Outlook 1994" for the commercial sector are as follows:

<u>Year</u>	<u>Electricity Use (Billions of BTUs)</u>	<u>Emissions (MMTC)</u>
1990	2,860,000	176.0
2000	3,300,000	203.1
2005	3,440,000	211.7
2010	3,510,000	216.0

EIA projects an annual growth rate of 1.0% for electricity use in the commercial sector for the years 1990-2010. For purposes of this proposal, the 0.7% growth rate is assumed to hold through the year 2030.

**Supplement B**  
**Explanation of Cost Calculations**

**Key Assumptions**

1. The factor for converting kilo-watt hours to MMTC is 0.21 MMTC/billion kWh.
2. The price premium is only paid on that portion of existing generation that comes from greenhouse gas generating (fossil fuel) resources. Given today's average national energy mix, the premium is thus paid upon approximately 65% of a customer's electric bill.
3. Federal electricity use will be reduced by 20% from 1985 levels as suggested by the 1992 Energy Policy Act.
4. The low case assumes federal government commits to participate in a green pricing program for electricity use at federal buildings. The high case assumes federal government commits to participate in a green pricing program for electricity use at federal buildings and electricity use in federal process operations.
5. The low case assumes the residential sector participates in green pricing programs at a rate of 5%. The high case assumes a residential participation rate of 10%.
6. The low case assumes the commercial sector participates in green pricing programs at a rate of 2%. The high case assumes a commercial participation rate of 5%.

**Federal Sector**

**Federal Administrative Costs**

These costs include:

1. monitoring federal greenhouse gas emissions;
2. implementing and coordinating a green pricing program at all federal buildings;
3. providing technical assistance to utility commissions on green pricing mechanisms.